

GRAPHIC COMMUNICATIONS AND PRODUCTION STANDARDS



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Office of Career, Technical and Adult Education
Nevada Department of Education
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Introduction

The standards in this document are designed to clearly state what the student should know and be able to do upon completion of an advanced high-school Graphic Communications and Production program. These standards are designed for a three-credit course sequence that prepares the student for a technical assessment directly aligned to the standards.

The Graphic Communications and Production Standards Writing Team determined that any statewide skill standards for Graphic Communications and Production programs must follow, as closely as possible, nationally-recognized standards. Many resources were considered and evaluated including PrintEd by Graphic Arts Education and Research Foundation (GAERF). The standards were industry validated through the coordination of industry representatives and the Office of Career, Technical and Adult Education at the Nevada Department of Education.

These exit-level standards are designed for the student to complete all standards through their completion of a program of study. These standards are intended to guide curriculum objectives for a program of study.

The standards are organized as follows:

Content Standards are general statements that identify major areas of knowledge, understanding and the skills students are expected to learn in key subject and career areas by the end of the program.

Performance Standards follow each content standard. Performance standards identify the more specific components of each content standard and define the expected abilities of students within each content standard.

Performance Indicators are very specific criteria statements for determining whether a student meets the performance standard. Performance indicators may also be used as learning outcomes which teachers can identify as they plan their program learning objectives.

The crosswalk and alignment section of the document shows where the performance indicators support the English Language Arts and the Mathematics Common Core State Standards, and the Nevada State Science Standards. Where correlation with an academic standard exists, students in the Graphic Communications and Production program perform learning activities that support, either directly or indirectly, achievement of one or more Common Core State Standards.

All students are encouraged to participate in the career and technical student organization (CTSO) that relates to their program area. CTSOs are co-curricular national associations that directly enforce learning in the CTE classroom through curriculum resources, competitive events and leadership development. CTSOs provide students the ability to apply academic and technical knowledge, develop communication and teamwork skills, and cultivate leadership skills to ensure college and career readiness.

The Employability Skills for Career Readiness identify the “soft skills” needed to be successful in all careers, and must be taught as an integrated component of all CTE course sequences. These standards are available in a separate document.

CONTENT STANDARD 1.0 : UNDERSTAND ALL ASPECTS OF THE GRAPHIC COMMUNICATIONS AND PRODUCTION INDUSTRY

PERFORMANCE STANDARD 1.1 : UNDERSTAND THE IMPORTANCE OF THE HISTORY OF THE INDUSTRY

- 1.1.1 Define significant inventions that impacted the industry
- 1.1.2 Explain impact of key figures such as Gutenberg, Senefelder, etc.
- 1.1.3 Describe the social impact of the printing industry throughout history
- 1.1.4 Research current trends in industry hardware and software

PERFORMANCE STANDARD 1.2 : UNDERSTAND THE CONCEPT OF THE WORK FLOW PROCESS

- 1.2.1 Illustrate work flow through a typical printing facility
- 1.2.2 Describe how new technology can affect and change the work flow process
- 1.2.3 Define the stages necessary for an effective work flow
- 1.2.4 Estimate total production time of a project to meet deadlines
- 1.2.5 Apply time management skills to meet deadlines

PERFORMANCE STANDARD 1.3 : UNDERSTAND CAREERS AND JOB OUTLOOK IN THE GRAPHICS INDUSTRY

- 1.3.1 Identify different career paths available in the field of graphics
- 1.3.2 Explain industry certifications available and their benefits
- 1.3.3 Research and report on a specific career path
- 1.3.4 Identify postsecondary opportunities in the field of graphics
- 1.3.5 Research job opportunities and projections for the industry in Nevada and nationwide
- 1.3.6 Compare and contrast the various types of printing, i.e., offset, screen, gravure, relief, and digital printing

PERFORMANCE STANDARD 1.4 : DEMONSTRATE AN UNDERSTANDING OF ENTREPRENEURIAL PRINCIPLES

- 1.4.1 Describe the importance of a business plan
- 1.4.2 Define entrepreneurship and entrepreneurial thinking
- 1.4.3 Identify governmental and private agencies that assist and encourage business development

PERFORMANCE STANDARD 1.5 : DEMONSTRATE PROFICIENCY IN INDUSTRY STANDARD MATH CONCEPTS

- | | |
|-------|---|
| 1.5.1 | Calculate conversions of metric and U.S. customary units measurements to points and picas |
| 1.5.2 | Calculate resolution respective to DPI, PPI, and LPI |
| 1.5.3 | Understand and apply formulas for scaling and ratios |
| 1.5.4 | Apply appropriate formulas in estimating final costs of jobs |
| 1.5.5 | Practice proper measuring techniques |

PERFORMANCE STANDARD 1.6 : EFFECTIVELY ESTIMATE ALL COSTS PERTAINING TO A PROJECT

- | | |
|-------|---|
| 1.6.1 | Estimate labor costs, including make-ready, manufacturing and cleanup |
| 1.6.2 | Estimate ink quantity and cost using standard time-tested formulas |
| 1.6.3 | Estimate substrate quantity and cost using appropriate formulas |
| 1.6.4 | Estimate cost of binding and finishing operations |
| 1.6.5 | Estimate cost of distribution and/or delivery |

CONTENT STANDARD 2.0 : DEMONSTRATE AN UNDERSTANDING OF ADVERTISING AND DESIGN

PERFORMANCE STANDARD 2.1 : DEMONSTRATE KNOWLEDGE OF COPYRIGHT AND INTELLECTUAL PROPERTY LAW

- 2.1.1 Research copyright laws, intellectual property rights, and counterfeiting laws as it relates to graphics
- 2.1.2 Explain design limitations and restrictions imposed by brands, organizations and institutions
- 2.1.3 Discuss fair use as it relates to graphic communications

PERFORMANCE STANDARD 2.2 : DEMONSTRATE KNOWLEDGE OF TYPOGRAPHY AND ITS APPLICATION

- 2.2.1 Identify and describe the major typeface classifications
- 2.2.2 Explain the anatomy of a typeface character
- 2.2.3 Explain the various styles within a typeface family and appropriate use
- 2.2.4 Select and apply appropriate font for target audience and media requirements
- 2.2.5 Apply proper type placement utilizing effective tracking, kerning and leading techniques
- 2.2.6 Demonstrate various type alignments, i.e., flush left, flush right, centered, or justified

PERFORMANCE STANDARD 2.3 : DEMONSTRATE VARIOUS PAGE LAYOUT TECHNIQUES FOR A VARIETY OF JOB APPLICATIONS

- 2.3.1 Design and produce a document using desired fonts, styles, margins, indents, tabs, and colors
- 2.3.2 Apply effective use of white space, headings, subheadings, body text, graphics, caption, etc., to graphic works
- 2.3.3 Create multiple page documents using text blocks, graphics, frames, and wrap-a-rounds
- 2.3.4 Proofread and edit using common editing marks and electronic proofing tools
- 2.3.5 Create a wireframe or series of thumbnail sketches for a proposed project
- 2.3.6 Create a preliminary rough layout for a proposed project
- 2.3.7 Create and prepare a final comprehensive layout for customer approval

PERFORMANCE STANDARD 2.4 : IDENTIFY AND APPLY ELEMENTS OF DESIGN

- 2.4.1 Define terms related to color theory and application
- 2.4.2 Identify and analyze elements of designs, i.e., color, line, shape, texture, size, value, etc.
- 2.4.3 Apply elements of design in student-generated hand-rendered and digital graphic works

PERFORMANCE STANDARD 2.5 : IDENTIFY AND APPLY THE PRINCIPLES OF DESIGN

- 2.5.1 Identify and analyze the principles of balance, rhythm, contrast, and unity in samples of graphic works
- 2.5.2 Apply principles of design, i.e., balance, rhythm, contrast, unity, etc., to student-generated graphic works
- 2.5.3 Apply principles of design in student-generated hand-rendered and digital graphic works

PERFORMANCE STANDARD 2.6 : UNDERSTAND THE IMPORTANCE OF SUBSTRATE SELECTION AS IT RELATES TO DESIGN

- 2.6.1 Analyze effect of substrate color
- 2.6.2 Analyze surface textures and coatings
- 2.6.3 Determine appropriate weight substrate
- 2.6.4 Explain importance of paper grain direction
- 2.6.5 Differentiate substrates intended for offset printing versus digital printing

CONTENT STANDARD 3.0 : DEMONSTRATE KNOWLEDGE OF DIGITAL FILE CREATION

PERFORMANCE STANDARD 3.1 : DEMONSTRATE AND UTILIZE INDUSTRY STANDARD SOFTWARE APPLICATIONS FOR DESIGN

- 3.1.1 Utilize appropriate software for illustrating
- 3.1.2 Apply appropriate software for text
- 3.1.3 Demonstrate application of image editing software and plug-ins
- 3.1.4 Demonstrate use of page layout software
- 3.1.5 Practice utilizing and accessing help features of a given software
- 3.1.6 Utilize appropriate software to create effective trapping

PERFORMANCE STANDARD 3.2 : DISTINGUISH THE CHARACTERISTICS AND ADVANTAGES OF A VARIETY OF FILE FORMATS AND THEIR USES

- 3.2.1 Compare and contrast lossy and lossless compression of image formats
- 3.2.2 List common types of file formats and their applications, including proprietary formats

PERFORMANCE STANDARD 3.3 : UNDERSTAND AND UTILIZE VARIOUS TECHNIQUES FOR DIGITAL IMAGE CAPTURE

- 3.3.1 Explain the role of resolution in image quality
- 3.3.2 Capture images using scanners and digital cameras
- 3.3.3 Download a digital image from a variety of sources

PERFORMANCE STANDARD 3.4 : UNDERSTAND HOW TO CREATE A DIGITAL IMAGE

- 3.4.1 Compare and contrast vector graphics and raster graphics
- 3.4.2 Select appropriate software to create vector and raster graphics
- 3.4.3 Explain appropriate use of color mode, i.e., CMYK, RGB, and spot color

PERFORMANCE STANDARD 3.5: UNDERSTAND HOW TO WORK WITH PORTABLE DOCUMENT FORMAT (PDF) FILES

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|-------|--|
| 3.5.1 | Explain the importance and uses of PDF files |
| 3.5.2 | Demonstrate the exchange of edits between users |
| 3.5.3 | Explain features of software to view, annotate, edit, and create PDF files |
| 3.5.4 | Produce a PDF file appropriate for offset, screen, gravure, flexographic, and digital printing |

PERFORMANCE STANDARD 3.6: PREFLIGHT FILES USING APPROPRIATE SOFTWARE

- | | |
|-------|--|
| 3.6.1 | Define preflighting and its purpose |
| 3.6.2 | Review files to identify potential problems at output (e.g., graphics not linked, incorrect color, missing or incorrect fonts, incorrect trapping, resolution) |
| 3.6.3 | Resolve problems identified in preflighting |

CONTENT STANDARD 4.0 : DEMONSTRATE ABILITY TO SEND DIGITAL FILES TO VARIOUS OUTPUT DEVICES

PERFORMANCE STANDARD 4.1 : IDENTIFY, SELECT, AND OPERATE APPROPRIATE OUTPUT DEVICES

- 4.1.1 Describe the use and application of imagesetters, proofing devices, platesetters, and digital presses
- 4.1.2 Compare and contrast images printed on various digital output devices
- 4.1.3 Explain the advantage and disadvantages of a direct-to-press system
- 4.1.4 Explain the advantages and disadvantages of full digital printing
- 4.1.5 Explain the halftone and color separation process

PERFORMANCE STANDARD 4.2 : DESCRIBE AND IMPLEMENT VARIOUS IMPOSITION TECHNIQUES

- 4.2.1 Lay out a sheetwise imposition and produce a finished product
- 4.2.2 Lay out a work-and-turn imposition and produce a finished product
- 4.2.3 Lay out a work-and-tumble imposition and produce a finished product
- 4.2.4 Produce a multiple up or ganged product using appropriate layout and finishing techniques
- 4.2.5 Design, lay out and produce a two-sided project
- 4.2.6 Create and utilize a folding dummy for various paginations

PERFORMANCE STANDARD 4.3 : PERFORM BASIC MAINTENANCE ON OUTPUT DEVICES

- 4.3.1 Read and understand manufacturer's instructions for maintenance of various output devices. Practice maintenance procedures on various output devices
- 4.3.2 Write a set of clear instructions to maintain or operate an output device
- 4.3.3 Properly replace and reclaim depleted print cartridges
- 4.3.4 Describe importance of proper cleaning and aligning printheads
- 4.3.5 Develop and follow a maintenance schedule
- 4.3.6 Maintain a log of all maintenance procedures performed
- 4.3.7 Explain why proper calibration is important for digital output devices

PERFORMANCE STANDARD 4.4 : DEMONSTRATE KNOWLEDGE OF DIGITAL PRODUCTION PRINTING

- 4.4.1 Define and describe digital production printing
- 4.4.2 Describe importance and function of a raster image processor (RIP)
- 4.4.3 Properly format RIP documents prior to output
- 4.4.4 Describe the difference between various types of inks and toners
- 4.4.5 Develop logical arguments about the role of digital printing in today's market

CONTENT STANDARD 5.0 : IDENTIFY AND PERFORM OFFSET PRESS OPERATIONS**PERFORMANCE STANDARD 5.1 : EXPLAIN THE FUNCTIONS OF A LITHOGRAPHIC PLATE**

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| 5.1.1 | Identify different types of lithographic plates |
| 5.1.2 | Compare advantages and disadvantages of each type of plate |

PERFORMANCE STANDARD 5.2 : IDENTIFY AND EXPLAIN THE BASIC SYSTEMS OF AN OFFSET PRESS

- | | |
|-------|---|
| 5.2.1 | Identify different types of feeding systems |
| 5.2.2 | Identify different types of register systems |
| 5.2.3 | Identify different types of press cylinder arrangements |
| 5.2.4 | Identify different inking systems |
| 5.2.5 | Identify different types of dampening systems |
| 5.2.6 | Identify different types of delivery systems |

PERFORMANCE STANDARD 5.3 : PERFORM PROPER MAKE-READY PROCEDURES

- | | |
|-------|---|
| 5.3.1 | Perform make-ready steps for proper paper handling |
| 5.3.2 | Select proper ink type: oil base, rubber base, soy base, or UV |
| 5.3.3 | Select and mix appropriate fountain solution |
| 5.3.4 | Prepare and adjust printing unit for reproduction |
| 5.3.5 | Set up delivery unit and select appropriate drying method if required |

PERFORMANCE STANDARD 5.4 : DIFFERENTIATE BETWEEN THE UTILIZATION OF SINGLE COLOR AND MULTI- COLOR PRINTING PRESSES

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|-------|--|
| 5.4.1 | Identify and explain different types of presses |
| 5.4.2 | Explain the importance of quality control devices, i.e., registration marks, crop marks, bleed marks, and color bars |
| 5.4.3 | Set up and print a single-color one-sided job |
| 5.4.4 | Set up and print a multi-color one-sided job with register marks and color bars |
| 5.4.5 | Set up and print a single-color properly registered two-sided job, using either sheet-wise, work-and-turn, or work-and-tumble imposition |
| 5.4.6 | Set up and print a multi-color properly registered two-sided job, utilizing all required quality control devices |

PERFORMANCE STANDARD 5.5 : PERFORM PROPER MAINTENANCE PROCEDURES ON OFFSET PRESSES

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|-------|--|
| 5.5.1 | Perform roller care and maintenance of inking and dampening systems |
| 5.5.2 | Demonstrate knowledge of pressure settings for ink rollers, dampening rollers, and cylinders |
| 5.5.3 | Install a new blanket and explain follow-up procedures |
| 5.5.4 | Demonstrate proper wash-up techniques for inking and dampening systems |
| 5.5.5 | Explain procedures for daily, weekly, and monthly maintenance on an offset press |
| 5.5.6 | Maintain a log book listing all procedures performed |

CONTENT STANDARD 6.0 : UNDERSTAND AND DEMONSTRATE SCREEN PRINT TECHNOLOGY PROCESSES AND PRODUCTION

PERFORMANCE STANDARD 6.1 : UNDERSTAND FRAMES AND SCREEN PREPARATION PROCESSES

- 6.1.1 Select appropriate frame size and fabric type for individual jobs
- 6.1.2 Choose appropriate mesh thread count for the job
- 6.1.3 Demonstrate proper techniques to frame fabric
- 6.1.4 Measure and adjust tension accordingly
- 6.1.5 Prepare mesh for direct or indirect emulsion

PERFORMANCE STANDARD 6.2 : SELECT AND APPLY APPROPRIATE STENCIL SYSTEM

- 6.2.1 Compare and contrast direct and indirect stencil systems
- 6.2.2 Properly apply a direct or indirect stencil system
- 6.2.3 Generate required film positive for screen exposure considering the following (i.e., consistent coverage, evidence of registration marks, knowledge and use of separations, evidence of color trap)
- 6.2.4 Align positive and expose screen using proper techniques of registration and screen exposure
- 6.2.5 Analyze latent image on screens after exposure
- 6.2.6 Wash out unexposed emulsion to create an image stencil by applying appropriate washout techniques
- 6.2.7 Evaluate stencil after washout, tape, and block-out as required

PERFORMANCE STANDARD 6.3 : PRINT A SUBSTRATE USING PROPER SCREEN PRINTING TECHNIQUES

- 6.3.1 Properly mount and register screens to press
- 6.3.2 Set screens for appropriate off contact
- 6.3.3 Check platens for proper adhesion
- 6.3.4 Apply appropriate color, type, and amount of ink specific to the job
- 6.3.5 Select appropriate squeegee; check for size and durometer
- 6.3.6 Run print test and check for quality; make adjustments as needed
- 6.3.7 Apply proper drying methods required for substrate and ink
- 6.3.8 Analyze print quality and adhesion to substrate
- 6.3.9 Set up and print single and multi-color one-sided job
- 6.3.10 Set up and print a properly registered single and multi-color two-sided job
- 6.3.11 Set up and print a halftone job
- 6.3.12 Identify different types of screen printing inks

PERFORMANCE STANDARD 6.4 : PRACTICE PROPER CLEANUP AND MAINTENANCE PROCEDURES

- | | |
|-------|---|
| 6.4.1 | Perform proper methods of ink removal |
| 6.4.2 | Conduct proper methods of stencil removal, analyze results, and inspect screens to ensure usability |
| 6.4.3 | Demonstrate press maintenance |
| 6.4.4 | Apply proper cleanup procedures using appropriate chemicals |

CONTENT STANDARD 7.0 : DEMONSTRATE KNOWLEDGE OF BINDING AND FINISHING OPERATIONS AND EQUIPMENT**PERFORMANCE STANDARD 7.1 : UNDERSTAND APPROPRIATE BINDING PROCEDURES**

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|-------|--|
| 7.1.1 | Demonstrate the use of common binding procedures |
| 7.1.2 | Demonstrate knowledge of finishing techniques and their appropriate applications |
| 7.1.3 | Properly set up and use a power paper cutter to achieve best yield from parent sheets |
| 7.1.4 | Explain and apply the binding principles of folding, scoring, gathering, and collating |
| 7.1.5 | Describe differences and advantages/disadvantages between in-line, off-line, and near-line finishing |

CONTENT STANDARD 8.0 : IDENTIFY AND FOLLOW APPROPRIATE ENVIRONMENTAL HEALTH, SAFETY, AND FIRST AID PROCEDURES
PERFORMANCE STANDARD 8.1 : DEMONSTRATE KNOWLEDGE OF RECYCLING/REUSE OPPORTUNITIES AND REQUIREMENTS IN THE COMMUNITY

- 8.1.1 Research local recycle centers and locations for hazardous waste disposal
- 8.1.2 Practice recycling wherever possible
- 8.1.3 Practice proper disposal of used materials

PERFORMANCE STANDARD 8.2 : UNDERSTAND LOCAL GOVERNMENT, EPA, AND OSHA REGULATIONS PERTAINING TO THE PRINT INDUSTRY

- 8.2.1 Research and list laws applicable to the print industry
- 8.2.2 Practice implementation of all regulations applicable to school lab
- 8.2.3 Define vocabulary and symbols associated with lab chemicals

PERFORMANCE STANDARD 8.3 : DEMONSTRATE KNOWLEDGE OF MATERIAL SAFETY DATA SHEETS (MSDS)

- 8.3.1 Read and interpret MSDS sheets
- 8.3.2 Locate MSDS sheets in lab
- 8.3.3 Understand safety rules involving flammable liquids

PERFORMANCE STANDARD 8.4 : UNDERSTAND EMERGENCY PLAN OF THE CLASSROOM AND SCHOOL SITE

- 8.4.1 Know location of evacuation plans and exits
- 8.4.2 Participate in emergency drills
- 8.4.3 Compare and contrast different types of fire extinguishers
- 8.4.4 Identify location and describe proper use of fire safety equipment

PERFORMANCE STANDARD 8.5 : DEMONSTRATE PROPER USE OF PERSONAL SAFETY EQUIPMENT

- 8.5.1 Demonstrate use of eye wash station
- 8.5.2 Practice using protective gear and apparel for personal safety

**CROSSWALK AND ALIGNMENTS OF
GRAPHIC COMMUNICATIONS AND PRODUCTION STANDARDS
AND THE COMMON CORE STATE STANDARDS
AND THE NEVADA SCIENCE STANDARD**

CROSSWALK

The crosswalk of the Graphic Communications and Production Standards shows links to the Common Core State Standards for English Language Arts and Mathematics and the Nevada Science Standards. The crosswalk identifies the performance indicators in which the learning objectives in the Graphic Communications and Production program support academic learning. The performance indicators are grouped according to their content standard and are crosswalked to the English Language Arts and Mathematics Common Core State Standards and the Nevada Science Standards.

ALIGNMENTS

In addition to correlation with the Common Core Mathematics Content Standards, many performance indicators support the Common Core Mathematical Practices. The following table illustrates the alignment of the Graphic Communications and Production Standards Performance Indicators and the Common Core Mathematical Practices. This alignment identifies the performance indicators in which the learning objectives in the Graphic Communications and Production program support academic learning.

CROSSWALK OF GRAPHIC COMMUNICATIONS AND PRODUCTION STANDARDS AND THE COMMON CORE STATE STANDARDS

CONTENT STANDARD 1.0: UNDERSTAND ALL ASPECTS OF THE GRAPHIC COMMUNICATIONS AND PRODUCTION INDUSTRY

Performance Indicators	Common Core State Standards and Nevada Science Standards
1.1.1	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation</p>
1.1.2	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation..</p>
1.1.3	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p> <p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>
1.1.4	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p>
1.2.2	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible</p>
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1.3.5	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p> <p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>
1.3.6	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>
1.4.3	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p>
1.5.1	<p><u>Math: Number & Quantity – Quantities</u> N-Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p>

CONTENT STANDARD 2.0: DEMONSTRATE AN UNDERSTANDING OF ADVERTISING AND DESIGN

Performance Indicators	Common Core State Standards and Nevada Science Standards
2.1.1	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>
2.1.3	<p><u>English Language Arts: Speaking and Listening</u> SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.</p> <p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p>
2.2.1	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>
2.2.5	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided (e.g., articulating implications or the significance of the topic).</p>
2.3.4	<p><u>English Language Arts: Language Standards</u> L.11-12.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.</p> <p>L.11-12.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.</p>
2.4.1	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.</p> <p>RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>

CONTENT STANDARD 3.0: DEMONSTRATE KNOWLEDGE OF DIGITAL FILE CREATION

Performance Indicators	Common Core State Standards and Nevada Science Standards
3.1.2	<u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
3.1.3	<u>English Language Arts: Speaking and Listening</u> SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
3.1.4	<u>English Language Arts: Speaking and Listening</u> SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
3.4.1	<u>Math: Number & Quantity – Vector and Matrix Quantities</u> N-VM.1 (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., \mathbf{v} , $ \mathbf{v} $, $\ \mathbf{v}\ $, v).
3.4.2	<u>English Language Arts: Speaking and Listening</u> SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
3.5.4	<u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
3.5.4	<u>English Language Arts: Speaking and Listening</u> SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
3.6.1	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
3.6.2	<u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.6 Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

CONTENT STANDARD 4.0: DEMONSTRATE ABILITY TO SEND DIGITAL FILES TO VARIOUS OUTPUT DEVICES

Performance Indicators	Common Core State Standards and Nevada Science Standards
4.1.1	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>
4.1.5	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>
4.3.1	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p>RST.11-12.10 By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.</p>
4.3.2	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.</p> <p>WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p>
4.3.5	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.</p> <p>WHST.11-12.2a Introduce a topic and organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.</p> <p>WHST.11-12.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>
4.3.6	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.</p>
4.4.1	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>
4.4.8	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.</p>

CONTENT STANDARD 5.0: IDENTIFY AND PERFORM OFFSET PRESS OPERATIONS

Performance Indicators	Common Core State Standards and Nevada Science Standards
5.1.2	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
5.1.3	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
5.2.1	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
5.2.2	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
5.2.3	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
5.2.4	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
5.4.1	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
5.4.2	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
5.5.6	<u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u> WHST.11-12.10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

**CONTENT STANDARD 7.0: DEMONSTRATE KNOWLEDGE OF BINDING AND FINISHING
OPERATIONS AND EQUIPMENT**

Performance Indicators	Common Core State Standards and Nevada Science Standards
7.1.3	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
7.1.4	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.
7.1.5	<u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u> RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.

CONTENT STANDARD 8.0: IDENTIFY AND FOLLOW APPROPRIATE ENVIRONMENTAL HEALTH, SAFETY, AND FIRST AID PROCEDURES.

Performance Indicators	Common Core State Standards and Nevada Science Standards
8.1.1	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u></p> <p>WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>
8.1.3	<p><u>Science: Nature of Science</u></p> <p>NA.12.5.1 Students know consumption patterns, conservation efforts, and cultural or social practices in countries have varying environmental impacts.</p>
8.2.1	<p><u>English Language Arts: Writing Standards for Literacy in Science and Technical Subjects</u></p> <p>WHST.11-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</p> <p>WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</p>
8.2.3	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u></p> <p>RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>
8.3.1	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u></p> <p>RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p> <p>RST.11-12.5 Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.</p>
8.4.3	<p><u>English Language Arts: Reading Standards for Literacy in Science and Technical Subjects</u></p> <p>RST.11-12.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.</p>

**ALIGNMENT OF GRAPHIC COMMUNICATIONS AND PRODUCTION STANDARDS
AND THE COMMON CORE MATHEMATICAL PRACTICES**

Common Core Mathematical Practices	Graphic Communications and Production Performance Indicators
1. Make sense of problems and persevere in solving them.	
2. Reason abstractly and quantitatively.	1.5.3, 1.5.4; 1.6.1, 1.6.2, 1.6.3, 1.6.4, 1.6.5
3. Construct viable arguments and critique the reasoning of others.	3.4.1
4. Model with mathematics.	
5. Use appropriate tools strategically.	6.1.4
6. Attend to precision.	1.5.1, 1.5.2, 1.5.5 6.1.4
7. Look for and make use of structure.	
8. Look for and express regularity in repeated reasoning.	